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EARLY OHIO BOTANICAL COLLECTIONS AND THE DEVELOPMENT OF THE STATE HERBARIUM[1]

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ABSTRACT. It was nearly 90 years after Ohio was admitted to the Union before a State Herbarium was organized in Columbus. The earliest collections of vascular plants in the state were made by Manasseh Cutler (1788), André Michaux (1793), François André Michaux (1802), and Thomas Nuttall (1810, 1816). By 1810, permanent residents began recording the flora and preparing herbarium specimens. First among these was Dr. Daniel Drake of Cincinnati, who was foremost in promoting the study of botany in the Ohio Valley. During the 1830s, the golden years of plant collecting by the pioneer botanists in Ohio, Drake's efforts came to fruition in his student, Dr. John L. Riddell, who through his field work, teaching, and publications on the flora and techniques for making herbarium specimens, involved a number of individuals in the study of botany early in the decade. Many of these individuals contributed specimens to the Flora of North America project of Drs. John Torrey and Asa Gray of New York City later in the decade. At this time, institutional herbaria were formed within newly organized scientific, medical, and philosophical societies, but these early attempts at institutional herbaria failed. The private herbaria of the pioneer collectors were either donated to larger institutions outside the state, left to an institution within the state that remained small or later disappeared, retained by family members, or destroyed by fire or lost. The development of private and institutional herbaria in the state was extremely quiescent from 1850 until the 1890s, after which Professor William A. Kellerman founded the State Herbarium at The Ohio State University. From specimens contributed largely by volunteers, the herbarium expanded under Professor John H. Schaffner.

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INTRODUCTION

The herbarium, an institution which houses and maintains dried plant specimens, documents the flora of a particular region at any given time and place and serves as a source of primary data for studies related to morphologic, systematic, geographic, and evolutionary botany. Collecting and preserving plants to make herbaria began in Ohio in the late 1700s as personal avocational efforts, first by traveling naturalists, then by resident physicians, businessmen, educators, and amateurs of varied interests. These private herbaria were the first sources for documenting the checklists and catalogues of plants, or floras, that were being written at the local and/or state level. A state-supported herbarium was not established until approximately 70 years after Ohio was admitted to the Union in 1803. The nucleus of this herbarium was organized within the newly-created Ohio Agricultural and Mechanical College, now The Ohio State University, Columbus, founded in 1870. Shortly after his arrival in 1891, William Ashbrook Kellerman, the first Professor of Botany, designated a State Herbarium that has since served as the major source of documentation for the flora of Ohio. The survival of the State Herbarium is provided for by law. Statute 3335.19

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of the Ohio Revised Code states that "The board of trustees of the Ohio state university shall secure and keep in the university a collection of specimens in . . . botany, and other specimens pertaining to natural history and the sciences. . . . Such specimens shall be properly classified and kept for the benefit of the university."

The primary objectives of this paper are to trace the early development of herbaria in Ohio, prior to the establishment of the State Herbarium, and to provide a brief history of the State Herbarium during its first 50 years. This account then is essentially a history of botanical exploration by those individuals who prepared herbaria and who wrote local catalogues or floras during the 19th and the first half of the 20th centuries in Ohio.

ROLE OF EXPLORER NATURALISTS BEFORE 1820

The earliest collections of vascular plants from Ohio were made by explorer naturalists, prominent among them being Manasseh Cutler, André Michaux, François André Michaux, and Thomas Nuttall. While in Ohio, these naturalists collected only a few plants, and at best, their specimens were generally small fragments. Many of their specimens were lost; those that survive are in herbaria outside of Ohio. Most of these document, as type specimens, species originally described from Ohio.

The Reverend Manasseh Cutler (1742-1823), a graduate of Yale College, was pastor of the church at Ipswich, Massachusetts, where he resided his entire life (Cutler and Cutler 1888, Lloyd 1903). With strong scientific inclinations, he became proficient in astronomy, meteorology, and botany. He collected and observed plants locally and was the first to write for New England *An Account of Some of the Vegetable Productions, Naturally Growing in this Part of America, Botanically Arranged* (1785). In 1787, the Ohio Company was organized to purchase land for a Western Colony, and Cutler was hired as the Company's agent to the United States Congress to make the purchase. He met with the directors of the Company at Marietta from 19 August to 15 October 1788, and although not the most favorable season for botanical investigation, Cutler examined and collected plants that were new to him. These specimens are thought to be the first obtained in Ohio and are believed to be part of his personal herbarium which was later destroyed by fire (Cutler 1895).

André Michaux (1746-1802), a French botanist, was commissioned in 1785 by the French government to study the trees of North America toward determining their suitability for the construction of naval vessels, and to obtain young plants and seeds for restoration of the severely depleted forests of France (Chinard 1957, Deleuze 1804, MacPhail 1981, Michaux 1889, Savage 1970). During the next 10 years, Michaux established nursery gardens at Bergen, New Jersey, and near Charleston, South Carolina, and explored the eastern part of the country for plants. In August 1793, he traveled by flatboat down the Ohio River from Pittsburgh to Limestone, now Maysville, Kentucky, and from there his travels in the Ohio Valley extended into central Kentucky, southern Indiana, and southern Illinois, as far west as St. Louis. While along the Ohio River he noted in his journal many of the woody and herbaceous plants he had seen and collected. At least 16 of his collections from the Ohio Valley formed the bases for new species described in his *Flora Boreali-Americana* (1803), the first attempt at a comprehensive flora of eastern North America. His specimens from the Ohio Valley are now part of the herbarium at the Muséum National d'Histoire Naturelle in Paris (Uttall 1984).

François André Michaux (1770-1855), accompanied his father to the United States in 1785, traveled on several of his expeditions, and assisted in the care of transplants in the nursery gardens (Chinard 1957, Durand 1857, MacPhail 1981, Savage 1970, Schramm 1957, True 1937). In 1790, young Michaux returned to France for a formal education, which in-

cluded the study of botany at the Muséum in Paris. He returned to the United States in 1801 to report on the condition of the nursery gardens and to make a more detailed study of the trees of North America for his government. With an eye toward those woody species that might enrich the forests of France, Michaux explored the eastern and midwestern portions of the country, and traveling by canoe, followed his father's route down the Ohio River in July 1802. He wrote of his travels in the *Voyage à l'Ouest des Monts Alléghanys* (1804). His major botanical contribution was the *Histoire des Arbres Forestiers de l'Amérique Septentrionale* (1810-1813), reissued in a three-volume translation as *The North American Sylva* (1817-1819). The younger Michaux's collections are also preserved in the herbarium of the Muséum National d'Histoire Naturelle.

Thomas Nuttall (1786-1859), a self-educated English naturalist, came at age 22 to Philadelphia and was employed by Benjamin Smith Barton (1766-1815), Professor of Materia Medica, Natural History, and Botany in the University of Pennsylvania. He explored the northern portions of the continent and collected specimens for Barton's contemplated flora of North America (Graustein 1967, MacPhail 1983, Pennell 1936). Nuttall made two trips into Ohio before 1818, the first in the spring of 1810 when he walked along the south shore of Lake Erie from Erie, Pennsylvania, to Huron, Ohio, and the second in the fall of 1816, when he traveled by boat down the Ohio River from Pittsburgh to Cincinnati. His botanical observations in Ohio were recorded in his now classic book *The Genera of North American Plants, and a Catalogue of the Species to the Year 1817* (1818), the first comprehensive flora of the continent written in English and published in the United States. Nuttall described as new to science four species from the Lake Erie shore and 15 from the Ohio River Valley. He lost most of his Ohio specimens from the earlier trip (Stuckey 1967b). However, specimens for all 15 of his new species from the Ohio River Valley, and at least four additional Ohio specimens, survive in the herbarium of the Academy of Natural Sciences of Philadelphia, where Nuttall deposited collections made before 1818 (Stuckey 1966b).

Examination of Nuttall's specimens reveals the general level of quality of the collections prepared by itinerant naturalists of this period. The specimens were usually small plant fragments, and by today's standards the data on the labels were extremely cryptic, consisting only of the scientific name of the plant and perhaps a locality, such as "Ohio River" or "Marietta." The name of the collector was not usually included, or if it was, it might be indicated by the first letter of the collector's name, e.g. "P" for Pursh. Later curators often added the collector's name, e.g. "Nutt." for Nuttall. The year of collection was seldom written on the labels, although sometimes the month was given. If a specimen was given to another individual, the recipient usually recorded the name of the donor on the label.

ROLE OF RESIDENT PIONEER BOTANISTS MOSTLY BEFORE 1830

By 1810, permanent residents began to record the flora and to make herbarium specimens. As with the explorer naturalists, the resident botanists retained their specimens as private collections. Prominent among these botanists active before the 1830s were Daniel Drake of Cincinnati, Samuel Prescott Hildreth of Marietta, and, to a lesser extent, Daniel Steinhauer of Zanesville and Chillicothe.

Daniel Drake (1785-1852), the pioneer physician and medical educator of Cincinnati, organized or founded colleges, hospitals, clinics, libraries, and literary, scientific, and professional societies (Horine 1961, Juettner 1909, Mansfield 1855). Born in New Jersey, Drake's boyhood was spent in Mays Lick, Kentucky. At the age of 15, he was taken to Cincinnati to study medicine. As a scientist, Drake was most interested

in the now largely-forgotten subject of medical topography, which gave him occasion to study such disciplines as geology and botany. Throughout his career, Drake successfully promoted the study of botany in the Ohio Valley (Stuckey 1978). He was the first resident of the West to provide information on botany in books that were published west of the Allegheny Mountains. In his first book, *Notices Concerning Cincinnati* (1810), he described the phenological progress, or flowering times, of selected plants observed in the Cincinnati neighborhood during the spring of 1809, and he noted the habitat, phenology, and medicinal properties of the columbo root, *Frasera carolinensis*. In his second book, *Natural and Statistical View, or Picture of Cincinnati, and the Miami Country*... ("1816" [1816]), Drake (1) listed the native trees (61 genera and 102 species) growing in the Miami country, (2) reviewed the characteristics of two species of buckeye, one of which he thought was new to science and described under the name *Aesculus maxima* (Stuckey 1969), (3) listed 66 plants useful in medicine and the arts, noting the medicinal properties of each plant and the part of the plant to be used, and (4) provided a floral calender. In 1818, Drake became the first individual west of the Alleghenies to give public lectures on botany. These lectures were continued by him and others and met with a considerable response. Another of his botanical firsts for the Western country was a set of guidelines for the collection of plants and preparation of herbarium specimens by medical students. In concluding a review of the principal reference books on American botany required by a medical student to gain an understanding of that subject, Drake (1828) urged that the student "should collect and arrange an *Herbarium* or *Hortus Siccus* of the plants within his reach, an undertaking of easy and most progressive accomplishment." He listed five rules for collecting plants. Evidence exists from four contemporary sources that Drake had his own herbarium, but its extent and whereabouts, if it still exists, are not known (Stuckey 1969).

Samuel Prescott Hildreth (1783-1863), long-time practicing physician, legislative representative, and esteemed scholar of Marietta, arrived from New England in 1806 (Southwick 1955, Waller 1944). He made mention of medicinal and other plants occurring in his vicinity in several of his early publications (Hildreth 1809, 1812, 1826, 1827). In 1830, he began the serious preparation of a cabinet of natural history specimens, which included dried plants (Hildreth 1849, 1915, Stimson 1863). The entire cabinet of approximately 4,000 specimens was donated to Marietta College in 1850, but the plants were not cared for and were subsequently destroyed by insect pests (Walp 1951). Hildreth published extensively in the fields of medicine, geology, conchology, meteorology, local history, and biography. He had a wide influence throughout the state, but his contributions to the development of botany during the 1830s would have been minimal had he not launched John L. Riddell into the study of the flora of Ohio. Hildreth also offered encouragement and suggestions to Increase A. Lapham in his efforts to develop an herbarium as part of the cabinet of natural history established by the Historical and Philosophical Society of Ohio, in Columbus.

Daniel Steinhauer (1785-1852), an Englishman and Moravian educator, established and taught private schools for young ladies in Zanesville (1819-1820) and Chillicothe (1820-1822), before relocating to Philadephia. While in Ohio he collected plants in the vicinities in which he lived and probably developed his own herbarium. His chief botanical mentor and correspondent was the foremost Moravian clergyman, the Reverend Lewis David von Schweinitz (1780-1834) of Bethlehem, Pennsylvania. Steinhauer sent Schweinitz specimens from Ohio, at least 50 of which have been located in the herbarium of the Academy of Natural Sciences of Philadelphia, where Schweinitz's extensive col-

lections were deposited following his death. These plants that Steinhauer sent to Schweinitz are believed to be the oldest extant herbarium specimens of Ohio vascular plants obtained by a resident of the state (Stuckey 1967a).

ROLE OF RESIDENT PIONEER BOTANISTS DURING THE 1830s AND 1840s

Drake's efforts to promote botany as an adjunct to the study of medicine came to fruition in his student, John Leonard Riddell (1807-1867). At age 27, the ambitious, attractive, and socially adept Riddell came to Cincinnati, became associated with Drake, and obtained a medical degree from him (Stuckey 1978, Waller 1945). Riddell already had much exposure to botany, having graduated in 1829 from the Rensselaer School at Troy, New York, where he had studied under the noted scientific educator, Amos Eaton (1776-1842). Following graduation, Riddell traveled widely in New York, Pennsylvania, and southern Canada as an itinerant lecturer in chemistry, botany, and geology (Riess 1977). Upon his arrival in Marietta in the summer of 1832, he met Samuel P. Hildreth, who encouraged him to study the local flora and to prepare sets of herbarium specimens for sale to subscribers. Riddell (1832a) advertised his wares in a local newspaper, the *American Friend and Marietta Gazette,* as follows:

> I would respectfully give notice, to those who may feel interested, that I shall be engaged the remaining part of the summer, in making botanical investigations in this county. Specimens of all the native plants, flowers and forest trees, will be collected and preserved; so that physicians and others wishing for a suit, as a reference to the spontaneous productions, growing in this region of the country, can possess the same by paying one of the following prices. $4,50 for 100 different species. $1,00 being allowed for paper, and $3,50 for specimens including the trouble of collecting, preserving, labelling and arranging, $6,50 for 150 species, $8,75 for 200 species, $10,75 for 250 species.
>
> J. L. RIDDELL, A.B.R.S.
> MARIETTA JULY 12, 1832

That same summer, in another local newspaper, the *Western Republican and Marietta Advertiser,* Riddell (1832b,c) had printed a list of local plants with notes on habitat, abundance, morphology, and medicinal properties (Walp 1951). However, Riddell desired a more stable financial situation and sought a teaching position in a medical school, although he did not yet have, but wished for, a medical degree (Stuckey 1978, Waller 1945). In the fall of 1832 he was appointed Lecturer in Chemistry in the Reformed Medical College at Worthington, Ohio. While there he continued to collect plants, principally in the vicinity of Worthington, in the Darby Plains west of Columbus, and along the canal south of Columbus. He published a *Catalogue of Plants, Growing Spontaneously in Franklin County, Central Ohio* . . . (1834b), the first checklist of plants for an Ohio county.

Riddell was successful as a teacher in the Reformed Medical College, but he continued to seek a position in the "regular" or more recognized medical schools. Toward that end, he sought Hildreth's assistance in becoming associated with Drake, but initially no help seems to have come from either physician. Undaunted, Riddell moved to Cincinnati in the spring of 1834, and two days after his arrival, as noted in his *Diary* (Vol. 11, p. 27, Tues. 18 April 1834): "Called on Dr. Drake and was well received. . . ." Drake tendered no offer of a position in a medical school at that time, but he did introduce Riddell to most of the botanists in Cincinnati. Riddell made local botanical excursions with them, visited in their homes, examined their herbaria, and exchanged specimens. Within a month of his arrival in Cincinnati, he began giving public lectures on botany, as had Drake 16 years earlier. As advertised, his lectures at the hall of the Ohio Mechanics Institute were "on the methods of forming *herbaria,* and on the affinities of plants, illustrated by a beautiful exhibition of specimens, taken mostly from the forest and prairies of Ohio" (Riddell, *Repository,* Vol. 6, p. 29, 1834). Ladies and gentlemen were invited to attend. Two months later, Riddell

(1834a) published directions for collecting and preserving plants. This paper, adapted in part from a similar work (1833) by Professor Charles Wilkins Short (1794-1863) of Transylvania University, listed in considerable detail the procedures for making an herbarium, and included descriptions and uses of needed equipment, directions for collecting, drying, and pressing the plants, and instructions for arranging the dried specimens in the paper, providing labels with necessary information, arranging specimens in the cabinet, and exchanging specimens with other collectors so as to increase one's knowledge. Riddell continued active field work, by making plant collections on a trip to the prairies near Dayton in the fall of 1834, and on an extended excursion from Cincinnati via Portsmouth, Columbus, Newark, Coshocton, and Akron, to Cleveland, mostly following the Ohio-Erie Canal, in the summer of 1835. Riddell's major contribution, *Synopsis of the Flora of the Western States* ("1834" [1835]), was the first comprehensive flora for the region west of the Allegheny Mountains to St. Louis. It was followed by his . . . *Supplementary Catalogue of Ohio Plants* (1836).

Riddell's achievements were noticed by his fellow Cincinnatians. He continued his public lectures in botany in the spring of 1835. In June, he was appointed Adjunct Professor of Chemistry and Lecturer on Botany in Drake's newly-created Medical Department of the Cincinnati College. Riddell also attended classes and received his medical degree in the spring of 1836, a member of the first graduating class. In the summer of 1836, he studied the botany and geology of northcentral Ohio for the newly-organized Geological Survey of Ohio. In the fall of that year, he left Cincinnati for New Orleans, where he had been appointed Professor of Chemistry in the Medical College of Louisiana. There he settled permanently and continued to grow in scientific stature.

Because Riddell collected plants extensively, and exchanged them liberally with his friends or sold them to subscribers, the surviving components of his herbarium of Ohio plants are now widely dispersed in this country and abroad (Stuckey 1978). Portions of his personal herbarium are at the United States National Museum and Tulane University. Specimens he sent to William Darlington (1782-1863), Charles W. Short, and John Torrey (1796-1873) were part of their herbaria which are today in the herbaria at West Chester (Pennsylvania) University, the Academy of Natural Sciences of Philadelphia, and the New York Botanical Garden, respectively. Two small herbaria of Ohio plants made by Riddell survive in the Lloyd Library, Cincinnati (Lloyd and Lloyd 1931), and at Marietta College. The latter collection was recently located in the Public Library at Marietta (Walp and Ortt 1974). These are not the specimens that Hildreth obtained from Riddell that were later part of the Hildreth herbarium, since destroyed, at Marietta College (Walp 1951).

Cincinnati of the 1830s and the early 1840s was certainly one of the most active botanical centers in the country. In addition to Drake and Riddell, its botanical circle included such businessmen as Thomas Gibson Lea, Joseph Clark, Robert Buchanan, and George Graham; physicians Isaac Colby, John Eberle, and John Locke; and educators Alexander Kinmont, John Locke, Milo G. Williams, and John Samples.

Thomas Gibson Lea (1785-1844), a native of Wilmington, Delaware, came via Pittsburgh to Cincinnati in April 1822. Following retirement from the mercantile business in 1827, he pursued a strong interest in botany and prepared a creditable herbarium of plants collected within 10 miles of Cincinnati (Lea and Lea 1906, Wilson and Fiske 1888). Lea was one of the most careful of workers and included extensive information on his labels, including habitats and place names. Following his death, his good friend William S. Sullivant arranged for publication of his *Catalogue of Plants, Native and Naturalized, Collected in the Vicinity of Cincinnati, Ohio, during the Years 1834-1844* (1849), the

first comprehensive local list of plants published for the region. Lea's herbarium passed to his son, James McClyment Lea (1827-1895), who in 1870 deposited it in the herbarium of the Academy of Natural Sciences of Philadelphia. A comprehensive study of Lea's herbarium was made by E. Lucy Braun (1934), and provided a valuable comparison of the flora of Cincinnati in the 1830s with that of a century later.

Joseph Clark (1782-1858), a native of Scotland, came to Cincinnati in 1823 and prepared an herbarium of plants of the area, which served as the basis for his *Catalogue of Flowering Plants and Ferns Observed in the Vicinity of Cincinnati* (1852), published by the Western Academy of Natural Sciences. At his death, Clark's herbarium passed to a relative and was later deposited in the Cincinnati Female Seminary. There Rachel L. Bodley (1831-1888), a pioneer among professionally educated women, arranged the specimens and had printed a *Catalogue of Plants Contained in the Herbarium of Joseph Clark, Arranged According to the Natural System* (1865). The *Catalogue* was the first list of plants written by a woman in Ohio. Clark's herbarium was lost when the Female Seminary was destroyed by fire.

Robert Buchanan (1797-1879), a native of northwestern Pennsylvania, arrived in Cincinnati in 1823 and became one of the most distinguished members of its business community. During leisure time he acquired considerable knowledge in the horticultural and natural sciences, and prepared an herbarium of local plants. His manuscript checklists of vascular plants observed in the vicinity of Cincinnati were published by Atwater (1838) and as "Addenda" to Joseph Clark's *Catalogue* (1852). Buchanan facilitated the exchange of specimens among the botanists of Cincinnati and their correspondents throughout the Ohio Valley and the country as a whole. He was a prime mover in the founding of the Western Academy of Natural Sciences in 1835 and of the Cincinnati Horticultural Society in 1843, serving as first president of both organizations. His herbarium was deposited with the Cincinnati Society of Natural History shortly after its organization in 1870 (Graham et al. 1880). Today these collections are part of the herbarium at the University of Cincinnati.

George Graham (1798-1881) came to Cincinnati in 1822 and engaged in numerous business enterprises, including the construction of roads, canals, and heavy machinery. He was a careful reader, a close observer, and a critical thinker, who acquired considerable practical and scientific knowledge. He was active in the organization of the city's scientific societies and a leader in the educational efforts of its schools. His collections of shells, fossils, and plants, stored in a warehouse, were destroyed by fire, but until his death he kept his devoted interest in natural history (James et al. 1881).

Among the Cincinnati physicians in Riddell's circle were Isaac Colby, John Eberle, and John Locke. Isaac Colby (1792/3-1866), of whom relatively little is known, was curator of the herbarium of the Cincinnati Medical Society. He published a paper (1834) on the methods of preparing specimens for the Society's herbarium and frequently accompanied Riddell on field excursions. No later than 1846 he left Cincinnati for Concord, New Hampshire (Smith 1893a,b). John Eberle (1787-1838), Professor of Practice in the Medical College of Ohio at Cincinnati, acquired in his day an international reputation as a medical educator (Eberle 1924, Juettner 1909 p. 136-140, Mitchell 1861, Radbill 1936). In his younger days in Lancaster, Pennsylvania, he botanized with the Rev. Henry Muhlenberg (1753-1815) and amassed an herbarium. Riddell, who was particularly critical of the quality of pressed plants, commented in his *Diary* (Vol. 11, p. 40, Mon. 14 April 1834) that Eberle's "plants are badly preserved. He came home with me, and looked over some of my plants, which he admired much." John Locke (1792-1856), who had abandoned the practice of medicine before com-

ing to Cincinnati, was better known as an inventor and as a teacher of botany, chemistry, and other physical sciences (Tucker 1952, Waller 1946, Winchell 1894, Wright 1857). In Cincinnati, he organized a nationally recognized school for young ladies, lectured at the Ohio Mechanics Institute, and held the position of Professor of Chemistry in the Medical College of Ohio. Riddell, in his *Diary* (Vol. 11, p. 44, Wed. 16 April 1834), commented that the plants in Locke's herbarium were "rather neatly preserved." Any surviving remnants of the herbaria originally assembled by these three individuals are not known. Although Eberle (1818) and Locke (1819) each published a small book explaining botanical terms to students, neither prepared a catalogue or local flora. In Locke's book, four pages are devoted to instruction for making an herbarium.

Among the educators in Riddell's circle was Alexander Kinmont (1799-1838), a native of Scotland, who came to Cincinnati in 1826 and conducted an academy which stressed the classics, mathematics, and freedom from discipline (Coyle 1962). He frequently botanized with Riddell, but nothing is known of his collection of plants. It is doubtful that Riddell had a botanical acquaintance with Milo G. Williams or John Samples, both of whom taught briefly in schools in Cincinnati. Williams (1804-1880), born and educated in Cincinnati, conducted private schools there and in Dayton, was principal of the high school in Springfield, and founded Urbana University (now Urbana College). Although he did not accept the formal title of president, he was the institution's first chief executive, and served as professor of science, dean of the faculty, president, and later secretary of the Board of Trustees (Murdoch 1945). Williams' herbarium, assembled from the neighborhoods of Cincinnati, Dayton, Springfield, and Urbana, reportedly consisted of several thousand sheets (Johnson 1930, Schaffner 1931), many of which survive at Urbana College. While in Cincinnati from 1840 to 1844, Williams was authorized to organize the botanical collections of the Western Academy of Natural Sciences, but little work was accomplished. He soon moved to Dayton, and the organization of the Academy's botanical collections was left to Joseph Clark.

Two of Williams' close botanical friends from southwestern Ohio were educators John Samples and John W. Van Cleve. Samples (d. 1842) taught in a private school in Urbana in the early 1830s and in a common school in Cincinnati from 1838 to 1839. He prepared an extensive herbarium of over 700 species, principally from Champaign County (Stuckey 1966a), which came into the possession of Adams Jewett (1807-1875), a physician of Dayton. Following his death, his son, Henry Smith Jewett (1846-1929), presented the herbarium of some 2,500 specimens to the University of Michigan, where it survives today. At Dayton, civic leader and sometime mayor John Whitten Van Cleve (1801-1858) was associated with Williams in teaching at the Dayton Academy. He developed an extensive herbarium of plants from that community, about 200 of which survive. These were given to the Cooper Female Seminary in Dayton, and later passed to William B. Werthner (1855-1929), a well-known teacher of botany in the Dayton Central High School, who presented them to the Museum of the Dayton Public Library, now the Dayton Museum of Natural History (Morse 1967a,b).

In central Ohio, in the communities of Worthington, Columbus, and Franklinton, another center of botanical study developed during the 1830s and continued into the 1840s. The Reformed Medical College, established in 1830 in Worthington, was organized on the "eclectic" plan of practice, which stressed the use of less toxic remedies and the extensive use of native plants (Felter 1902, 1903, Stuckey 1978). Although initially successful, the College met with various difficulties and was forced to close in 1839. During its existence, the Medical Department offered

a viable instructional program in materia medica and botany. Among its lecturers in these disciplines were Drs. Ichabod Gibson Jones (1807-1857), John Leonard Riddell, and Jonathon Roberts Paddock (1803-1878). In 1834, Jones left Worthington to establish a private practice in Columbus and Riddell went to Cincinnati. Jones is supposed to have written botanical papers and prepared a "complete and beautiful herbarium" of the plants of central Ohio (Loving 1904, 1912). Following his death, Jones' herbarium, consisting of grasses, flowering shrubs, and other plants indigenous to the region, went eventually to his daughter, Emma (1848-1939). Miss Jones' estate has yet to be traced, and no further information on this herbarium has become available.

Following the close of the Worthington college, Paddock moved to Maysville, Kentucky, and practiced privately until his death. He has been described by a contemporary as a skillful physician, classical scholar, and splendid botanist able "to name all the plants and trees of the state by sight" (Felter 1902 p. 89-90, 1903). He published no catalogues or floras, but did engage in correspondence with John Torrey, to whom he sent a few herbarium specimens which survive at the New York Botanical Garden. Between 1837 and 1839, Paddock assembled an herbarium of central Ohio plants which was purchased in 1919 by the University of Illinois (Anonymous 1920, Stuckey 1978).

In Franklinton, Joseph Sullivant (1809-1882), youngest son of Lucas Sullivant (1765-1823), who had founded the towns of Franklinton and Columbus, was devoted to art, literature, science, and education but was particularly interested in the study of natural history (Sullivant 1874). By the mid-1830s Joseph had assembled a cabinet of natural history specimens, which included an herbarium (Curtis 1839, Sullivant 1874). He also encouraged his eldest brother, William Starling Sullivant (1803-1873), to study natural history. By the mid-1830s, William had accumulated considerable wealth through development and expansion of a number of the business enterprises of his late father, and now devoted his leisure time to science (Meyer 1983, Rodgers 1940). He undertook the study of flowering plants, particularly the grasses and sedges of central Ohio, and began traveling to various parts of the state to obtain specimens for his herbarium. These efforts resulted in a published *Catalogue of the Plants, Native or Naturalized, in the Vicinity of Columbus, Ohio* (1840), and an extensive exchange of specimens with botanists throughout the country. With his second wife, Eliza Griscom Wheeler Sullivant (1817-1850), of New York City, whom he married in 1834, Sullivant engaged in a thorough study of North American mosses and liverworts which continued as a labor of love until her death. Following a third marriage, Sullivant pursued his scientific studies to the extent that he achieved a reputation as the world's foremost North American bryologist.

In the early years of his studies with flowering plants, Sullivant encircled himself with the physician-botanists of central Ohio. Among these associates were Drs. Jones and Paddock of Franklin County, and Drs. John Milton Bigelow (1804-1878) of Lancaster and Asa Horr (1817-1896) of Baltimore, both in Fairfield County. In collaboration with Horr, Bigelow published a *Florula Lancastriensis* (1841), and later Bigelow (1849) prepared a list of medicinal plants of Ohio for the Fairfield County Medical Institute. These two gentlemen assembled large private herbaria, but each left the state, Bigelow to go to Detroit, Michigan, in 1860 (Waller 1942), and Horr to go to Galena, Illinois, in 1846, and then the next year to settle permanently in Dubuque, Iowa (Crosby 1915). Bigelow's herbarium is not known to exist, and Horr's herbarium, containing his plants from Ohio, was left to Iowa State University in Ames (Stuckey 1978). Sullivant's entire phanerogamic herbarium of 10,000 specimens, representing 600 species, was sent in 1868 to Professor Asa Gray (1810-1888) of

Cambridge, Massachusetts, where it later became a part of the Gray Herbarium of Harvard University. About 390 species of Sullivant's phanerogams remain intact as a single unit in the herbarium of The Ohio State University. These specimens, all labeled with the year 1840, were acquired from the Department of Horticulture, to which they had been donated by Joseph Sullivant, who was instrumental in the founding of the University (Meyer 1983, Stuckey and Wentz 1974).

BEGINNINGS OF INSTITUTIONAL HERBARIA IN AMERICA

Shortly after the deaths of Henry Muhlenberg (1753-1815) and Benjamin Smith Barton (1766-1815), their private herbaria were acquired by the American Philosophical Society of Philadelphia. However, these acquisitions were scarcely noticed and were in no realistic sense activities of the Society. Meisel (1924 p. 20-21) listed several early scientific societies and institutions which housed institutional herbaria. According to Gordon (1952), only four such herbaria existed in the United States before 1830. Shetler (1969 Table 8) gave dates for a few small institutional herbaria founded before 1800 and identified 10 such North American herbaria founded before 1830. Of those 10, the herbarium of the Academy of Natural Sciences of Philadelphia, begun in 1812, is now the largest and most prestigious, having received the individual herbaria of the American Philosophical Society on permanent loan in 1897 (Pennell 1950). These early institutional herbaria received plants primarily as gifts, often from the estates of deceased collectors. The most publicized example of a private herbarium that went to an institution is that of Zaccheus Collins (1764-1831) of Philadelphia (Stuckey 1971). The early institutional herbaria were poor financially, often did not have regular or appointed curators, and functioned largely as storage places for the collections.

During the pioneer period in the Ohio Valley, herbaria were formed within newly-organized scientific, medical, and philosophical societies, but these early attempts were failures in the sense that none of them has survived. The earliest of these societies were the Western Museum Society (1818), the Cincinnati Medical Society (1831), and the Western Academy of Natural Sciences (1835), all of Cincinnati, the undisputed center of economic and cultural activity in the Ohio Valley of the 19th century. The Historical and Philosophical Society of Ohio, founded in Columbus in 1831, later relocated to Cincinnati and merged with the Cincinnati Historical Society, under which name it survives today, but without the herbarium envisioned by its original members.

THE WESTERN MUSEUM SOCIETY

The Western Museum Society, founded in Cincinnati in the spring of 1818 by Daniel Drake and his associates, was the first organization of its type west of the Allegheny Mountains (Drake 1820, Slack et al. 1818). The Society was committed to the idea of extending knowledge of the natural world, and announced plans for a library and for scientific collections in natural history, mineralogy, geology, and anthropology. Collections were to come from all parts of the United States, but special emphasis was placed on those from the Ohio Valley. Arrangements were made to house the collections at the Cincinnati College. A staff was appointed to supervise the operations, and included curator Robert Best (1790-1830), a young assistant in chemistry and physics at the Cincinnati College, and John James Audubon (1785-1851), as Best's assistant. Prominent scientists in the East were elected to corresponding memberships. A course of public lectures provided the West with its first formal scientific training outside of the medical schools.

The Museum was formally opened to the public on 10 June 1820 with Drake (1820) presenting a discourse which outlined the Society's scientific hopes and potential benefits to the public. Concern-

ing the development of the collections in natural history, and especially botany, Drake said:

> As an Herbarium is contemplated among the future acquisitions of the Society, and as the Managers are desirous of promoting the introduction and cultivation of exotic plants, they will be pleased to receive any valuable seeds and roots of other countries, and will, in return, transmit such of our indigenous vegetable productions as may be requested.

To foster the cause, Drake contributed to the Society his own "cabinet of minerals, organic remains, fossil bones, and Western antiquities" (Drake and Mansfield 1827 p. 45). This cabinet may have included Drake's personal herbarium. By 1823, the Society possessed 325 botanical specimens. At that time, the Society went into debt as an economic depression came to Cincinnati. Personal problems and public controversies resulted in the loss of Drake's leadership, as he left the city to teach at Transylvania University for the next four years (Hendrickson 1946). The Society's possessions were offered at auction, but there were no buyers. Consequently, the possesions were placed in the care of Joseph Dorfeuille (1791-1840), a Frenchman who had arrived in Cincinnati about 1820 (Kellogg 1945 p. 3-5, 23). Dorfeuille turned the enterprise into a public museum, which became less scientific as time passed. In 1839, he sold part of the contents to a group of Cincinnatians who, under various ownerships, were able to maintain the museum as a public facility until 1867. Dorfeuille left Cincinnati with part of the collections and opened a short-lived museum in New York City (Tucker 1967). The fate of the scientific collections of the original Western Museum Society remains unknown. Meisel (1926 p. 391) wrote that the collections were incorporated into those of the Western Academy of Natural Sciences, but documentation for this statement is lacking, as no mention of such a transfer appears in the minutes of the Academy's meetings. Drake's dream of the Society as the focal point for western scientific activity failed to materialize, but in 1835, those Cincinnatians who were scientifically inclined again came together to organize a new academy.

THE WESTERN ACADEMY OF NATURAL SCIENCES

The Western Academy of Natural Sciences of Cincinnati had its inception at a meeting of 21 "friends of science" in the hall of the Cincinnati Medical Society, 25 April 1835 (Foote 1855, Hendrickson 1947, Shapiro 1976). Again, Drake was at the forefront in the organizational efforts, lending his presence and prestige, stating the objectives of the organization, and seconding the resolution offered by James Hall (1793-1868). As recorded in the minutes (W.A.N.S. 1835-1840), the primary objective was: ". . . to form a Society for the promotion of Natural History; to be composed of such naturalists and friends of Natural Science as may be disposed to devote themselves to the preservation & collection of facts and specimens in the various branches of this department of knowledge."

Robert Buchanan, prominent businessman with an avocation for natural history, chaired the initial meeting and then became first president of the organization. Buchanan's prestige as a promoter and leader of cultural activities, especially those that were scientific, along with his financial support, allowed the organization to survive. He was continued as president through 1838. The organization held frequent meetings, and members read scientific papers, held discussions concerning nomenclature and classification of organisms, elected corresponding members, and received donations of specimens. Among the officers elected were a librarian and curators. At some time during its existence, the following served as curators of botanical collections: Buchanan, Joseph Clark, John Locke, John L. Riddell, John A. Warder, and Milo G. Williams. During the first year, Riddell also served as librarian. He also reported on the geology and wet prairies of Ohio,

read descriptions of plants, and exhibited dried specimens. Locke lectured on the best methods for the preparation and preservation of botanical specimens. According to the minutes, his remarks were: ". . . principally confined to the selection of plants, the structure of a press, the process of drying, and the arrangement of an herbarium. He exhibited to the Society specimens of the whole, at various periods which were highly credible to the lecturer, both as to taste and mechanical execution."

Of this meeting, Riddell wrote in his *Diary* (Vol. 13, p. 7, Wed. 3 June 1835): "Dr. Locke several times in the course of his paper, made creditable mention of myself." Later, Locke (1836) published a drawing and description of his plant press, which he considered to be an improvement on the one earlier figured and described by Riddell (1834a).

During the existence of the organization, donations of plants for an herbarium were received from several of its members, including Buchanan, Clark, Drake, Warder, and Williams. The specimens presented by Drake were not part of his own herbarium but rather were specimens received on exchange from John Stevens Henslow (1796-1861), Regius Professor of Botany at Cambridge University in England, but better remembered as Charles Darwin's teacher (Russell-Gebbett 1977, Stuckey 1969). By 1841, the herbarium contained 2,000 pressed plants (Cist 1941 p. 109).

On occasion, the Academy undertook publication of works prepared by its members. The only published botanical paper was a *Catalogue of Flowering Plants and Ferns Observed in the Vicinity of Cincinnati* (Clark 1852), a 30-page booklet with a list of 368 genera and 686 species, without descriptions or locations. An "Addenda" of 95 species was furnished by Robert Buchanan.

The Academy was an organization of a few devoted members who had a special interest in a narrow aspect of natural history, primarily in the collection, naming, and classification of organisms. Although some of its members were prominent businessmen, they did not see to it that the Academy was placed on a sound financial basis. By the 1850s, as movements began in the United States for the establishment of public museums and popular scientific education, the Academy was no longer in a position to provide leadership; consequently it merely faded away. The minutes of the Academy's meetings ended in April 1854, but the library and cabinet of natural history were maintained intact, although they were unavailable to the public until 1870, when they were given to the new Cincinnati Society of Natural History, to form the basis of its collections.

THE CINCINNATI SOCIETY OF NATURAL HISTORY

The Cincinnati Society of Natural History, organized with 25 members on 19 January 1870 as a free public educational institution, conducted scientific explorations and investigations, received collections, and provided lectures on scientific subjects to the public (Anonymous 1878, Shotwell 1902). John Aston Warder (1812-1883), retired physician and accomplished botanist, horticulturist, and forest conservationist, served as president for the first five years. The six surviving members of the old Western Academy were elected to life memberships. Among them was Buchanan, who donated his personal herbarium to the Society (Graham et al. 1880, Hendrickson 1947). By 1883, the Society's herbarium totaled 3,300 species (James 1883). The curators of botany and years of their service are listed in table 1. Its herbarium was acquired by Curtis Gates Lloyd (1859-1926), who made it a part of the scientific collections of the Lloyd Library of Cincinnati. In 1940, the Lloyd Herbarium of flowering plants, comprised of over 29,000 sheets, was sent on long-term loan to the herbarium of the Department of Botany of the University of Cincinnati (Simons 1972). Today, the Society maintains a very active public museum of natural history, the Cincinnati Museum of Natural History.

TABLE 1

Curators of Botany and Years of Service (1870-1906) in the Cincinnati Society of Natural History, compiled from data in the Journal of the Cincinnati Society of Natural History, *Volumes 1-21, 1878-1910.*

Curator	Years
Horatio Wood	1870-71
William Owens	1871-72
Miss M. J. Pyle	1872-73
John Hussey	1873-74
Paul Mohr, Jr.	1874-76
Davis L. James	1876-80, 1891-95
Curtis G. Lloyd	1880-81, 1895-97
Oliver D. Norton	1881-84, 1888-89
Miss Sarah C. Stubbs (Became Mrs. Joseph F. James, 1884)	1884-85
Miss Nettie Fillmore	1885-87, 1889
Miss Anna M. Brown	1887-88
Joseph F. James	1888
Charles L. Herrick	1889-90
Walter H. Aiken	1897-1906

THE CINCINNATI MEDICAL SOCIETY

The Cincinnati Medical Society was founded 4 March 1831, principally as a forum for the exchange and dissemination of ideas, but also as a social gathering (Drake 1833, Juettner 1909 p. 439-440). Throughout most of the year, regular Wednesday evening meetings were held, at which time it was customary for a member to read a paper on any medical subject and to defend it in discussion. In 1833, the organization gained stature when it obtained a charter from the Ohio Legislature. An effort was made to develop an herbarium, a cabinet of pharmacy, and a library. The herbarium focused on medicinal plants and was under the curatorship of Isaac Colby (1834), who described proper procedures for preparing herbarium specimens and recommended books for the study of plants. He gratefully acknowledged those anonymous persons who had already donated dried specimens for his new herbarium, and he sought voluntary contributors who would continue to add to it. This herbarium offered to its donors a service not offered by previous institutional herbaria. Colby explained:

> If any persons should have plants whose names they are unable to fully make out, and should be disposed to send their duplicate specimens, numbered, to the Herbarium, accompanied with such remarks respecting the habits of the plants as may occur, the Curatior [sic] will take great pleasure in examining them and will, if in his power, return the names attached to the numbers, to those who sent them.

The herbarium of the Cincinnati Medical Society was a co-operative enterprise, and may represent the best example of an early effort to form a truly institutional herbarium. Of the other botanists in Cincinnati, only John L. Riddell seems to have participated; he was elected mineralogist in 1835 (Drake 1835) and treasurer in 1836 (Wood 1836). The whereabouts of the Society's herbarium, if it should still exist, is not known. The members of the Society must have worked diligently during its short life. Accomplishments were many, as shown by the publications of its members in the western medical journals, its preparation of an herbarium of medicinal plants, its assemblage of a cabinet of pharmacy, and its development of a working reference library. The organization of the Medical Department of the Cincinnati College by Daniel Drake in 1835 infused the members with new enthusiasm, but the struggle between Drake's department and the rival Medical College of Ohio soon involved and drained the Society, and it was abandoned about 1838 (Juettner 1909 p. 439-440).

THE HISTORICAL AND PHILOSOPHICAL SOCIETY OF OHIO

Organized for the purpose of promoting the study of the state's civil, political, and natural history, the Historical and Philosophical Society of Ohio was incorporated by the Ohio General Assembly 11 February 1831 and held its first meeting in Columbus on 21 December 1831 (Foote 1855, Hall 1956, Shepherd 1945). Earlier, on 12 February 1822, the State Legislature had incorporated a Historical Society of Ohio, but it soon failed. The new Society had the support of prominent individuals throughout the state, including

the first president, Benjamin Tappan, Jr. (1773-1857) of Steubenville, a knowledgeable jurist who became well known for his literary achievements and his work in natural history (Dexter 1971). Meetings were held only once a year, in December, in Columbus. To further the study of natural history, the Society established a cabinet, and those initially designated as curators were Gustavus Swan of Columbus, Samuel P. Hildreth of Marietta, Edward King of Chillicothe and later Cincinnati, B. G. Leonard of Chillicothe, and Jared P. Kirtland of Poland. Later, Joseph Sullivant of Franklinton, also an original incorporator, served as a curator.

The development of an herbarium as part of the cabinet of natural history resulted chiefly from the efforts of Increase Allen Lapham (1811-1875), who at age 22 had been appointed Secretary of the State Board of Canal Commissioners (Lapham 1811-1875 p. 223, Randall 1909). He arrived in Columbus from Portsmouth in the spring of 1833, and was elected a member and curator of the Society in December. The following December, he was elected treasurer, and consequently became the chief officer to whom specimens for the cabinet were sent. Hildreth, in a letter of 3 June 1834, encouraged Lapham "to make full collections of the indigenous plants found in the prairies not only for yourself but also for the Phil. & Hist. Soc." During the summer of 1834, Lapham and Joseph Sullivant collected a great number of indigenous plants for the Society's herbarium, as Lapham informed Hildreth in a letter of 20 September 1834. Lapham also sent Hildreth a manuscript catalogue of Ohio plants, prepared from his own observations and from the writings of others. He asked for information on forming a cabinet, with particular concern for arrangement of specimens, the most suitable cases, and the best method of labeling the specimens. In his reply of 1 October 1834, Hildreth expressed happiness at learning of the deep interest Lapham was taking in the establishment of a state cabinet, and he included suggestions for its preparation.

As noted to his brother Darius in a letter of 18 May 1834, Lapham also had access to an herbarium of about 450 plants collected at Worthington by John L. Riddell in 1833. Lapham expected that Riddell's collection would become a part of the Society's herbarium, but no known evidence exists that it ever came to the Society. Riddell had left central Ohio in April 1834, but he had an interest in the Society. As stated in his *Diary* (Vol. 9, p. 148, 1833), Riddell intended to donate a labeled collection of minerals to the Society. Riddell was elected a member of the Society at the December 1834 meeting, and he examined the Society's herbarium when he visited Lapham in Columbus during July 1835. At that time, as noted in his *Diary* (Vol. 13, p. 39, Fri. 3 July 1835), Riddell promised to add specimens to the Society's herbarium. At the meeting in December 1835, a committee was appointed to prepare a catalogue of the animals, plants, and minerals of the state of Ohio, with a report expected at the meeting a year later (Dorfeuille 1835). Among the 9 members appointed, the following had strong interests in botany: Lapham of Columbus, Buchanan and Riddell of Cincinnati, Hildreth of Marietta, Kirtland of Poland, and Joseph Sullivant of Franklinton. Evidence is lacking that this committee prepared any report on plants.

By 1838, interest and participation in the Historical and Philosophical Society became difficult to sustain, and little activity occurred for several years. In 1849, the meeting place was changed from Columbus to Cincinnati, and at that time the Society merged with the Cincinnati Historical Society, which had been formed in 1844. The organization continued operation under the name of the Historical and Philosophical Society of Ohio until 1963, when it again became the Cincinnati Historical Society, by which name it is known today. The fate of the Society's cabinet of natural history, which included the herbarium developed principally by Increase A. Lapham and Joseph Sullivant, has not been learned.

THE GEOLOGICAL SURVEY OF OHIO

In the mid-1830s, a Geological Survey of Ohio was contemplated by the State Legislature, and encouraged by prominent and geologically knowledgeable individuals in the state. Lapham, who apparently had gained stature by virtue of his botanical studies for the Historical and Philosophical Society of Ohio, used his influence with the legislature to promote the establishment of the survey. In writing to the Honorable J. M. Creed in December 1835, Lapham presented a prospectus and stated that it would require four years to complete the survey work. He noted that one botanist would be necessary, at a salary of $1,000 per annum, who "should be directed to make a collection of all the species of plants . . . of the state as far as practicable and deposit them with the other specimens at Columbus. Concise descriptions of each should be drawn up and an account of the uses of each given." Lapham's plan would have established a State Herbarium, either as part of the Geological Survey or as a part of the cabinet of natural history of the Historical and Philosophical Society. In March 1836, the Ohio Legislature appointed S. P. Hildreth, J. Locke, J. L. Riddell, and I. A. Lapham a committee "to report to the next Legislature the best method of obtaining a complete Geological Survey of the State" (Stoddard 1928). The committee recommended the appointment of one naturalist, and stated that "The Survey . . . ought not only to embrace the simple geology, but also the topography, botany, as far as to include a list of the plants in the State, forest trees . . ." (Hildreth 1836). In March 1837, upon acceptance of the separate reports of Hildreth (1836), Riddell (1837), and Lapham (1837), the first Geological Survey of Ohio was authorized for the years 1837-1838. The results of the Survey were reported by William W. Mather et al. (1838). Jared P. Kirtland, then associated with the Medical College of Ohio in Cincinnati, was appointed second assistant and "directed to take charge of the Department of Botany and Zoology. His work involved a description, and the completion of catalogues, of all living organic matter of the State." In his report, Kirtland (1838a) described the scope of his assignment with the Survey:

> It is designed to make out as full and perfect catalogues as possible of all our Animals, . . . and all of our vegetables; arranging them according to their classes, families, orders, genera and species; giving each both its scientific and common name, and at the same time noting any peculiar or important character it may possess.
>
> Also, to collect and prepare specimens of the various species, as far as practicable, for the use of the State. If suitable means be taken, afterwards, to preserve them, they will compose a standard Cabinet, to which all classes of citizens can resort, either for amusement, or for the more profitable pursuit of acquiring a knowledge of the Natural History of this section of the country. And although it cannot be expected that one individual will be able to make out a perfect collection, during the time that will probably be allowed for completing the Geological Survey; yet it may be made so extensive so to form the basis or nucleus, to which additions will be constantly made, by the labors of naturalists, who will be stimulated to exertion by the collection already formed.

Kirtland wrote several letters to Hildreth wherein he discussed his work with the Geological Survey (5 August 1837, 19 April 1838, 24 August 1838, 27 November 1838). Upon learning that the State Legislature would not continue funding for the Survey, Kirtland told Hildreth that he planned to complete his "catalogues of Mammalia, Birds, Reptiles, & Fish & Shells, and then resign — my list of . . . Insects and Plants I shall leave without attempting to furnish a list or collection" (19 April 1838). Later (24 August 1838), he noted to Hildreth: "If the State wishes to have these branches of the Natl. History settled it will be the business of another contract, as my present connections with the Board will cease this Season by my resignation." Kirtland (1838b) did complete his catalogue of animals, as projected in the letter to Hildreth, but no plant catalogue was written. As stated in his report, Kirtland (1838a) intended to place his collections in Co-

lumbus, but whether any plants were transferred is not known. In March 1838, as part of the concluding work of the Survey, the legislature ordered that all collections be deposited with the Historical and Philosophical Society of Ohio (Stoddard 1928).

Lapham, with his interest in the development of the herbarium for the Historical and Philosophical Society, and Riddell, with his extensive botanical knowledge of the state and his publication of the *Synopsis* ("1834" [1835]) and the *Supplementary Catalogue* (1836), were undoubtedly highly qualified to prepare a plant catalogue for the Geological Survey, but both of them left Ohio in 1836, with Lapham moving to Milwaukee in June, and Riddell to New Orleans in October. Three years later, Riddell published a *Monograph of the Ligneous Plants Indigenous to Ohio* (1839), the first annotated list of woody plants for the state.

PREPARATION OF HERBARIA AND FLORAS BETWEEN 1850 AND 1890

The development of private and institutional herbaria in Ohio was relatively quiescent from 1850 to 1890. The Geological Survey of the 1830s had failed to publish a catalogue of the state's flora, and its collections had since been lost to scientific study.

In early December 1856, John Hancock Klippart (1823-1878), then of Cleveland, sought and won election to the office of corresponding secretary of the Ohio State Board of Agriculture, in which he continued until his death (Barnett 1928, Cunningham 1952). Early in 1857 he came to Columbus to assume his new office. He soon "conceived the idea of compiling and publishing a catalogue of the 'plants of Ohio'," and by the end of that year he and Henry Nicholas Bolander (1831-1897) began "a botanical survey of Franklin, Madison, Fairfield, Licking, and Delaware coun[ties]" (Klippart 1878). Herbarium specimens were collected and prepared chiefly by Bolander (Klippart 1860). Meanwhile, according to Klippart (1878),

> . . . a correspondence was commenced with every person who was engaged in collecting plants throughout the State. We received quite a number of manuscript catalogues of limited localities, which we utilized. In the State Library we found a catalogue of the plants of Franklin County, by W. S. Sullivant. In 1859, I met Dr. Bigelow, of Fairfield county, at the State Fair at Zanesville, and he gave me a printed catalogue of the plants of Fairfield county. I obtained from Robt. Clarke (bookseller) a catalogue of the plants of Hamilton county, by Joseph Clarke [sic], and another of the same by Thomas G. Lee [sic]. My friends Messrs. J. P. Kirtland and J. S. Newberry, furnished printed catalogues of the plants of Summit[,] Cuyahoga, and Lorain counties.
>
> In addition to these manuscripts and printed catalogues, the very extensive herbarium prepared by Dr. Howard, formerly of Elyria, was on deposit in the State Agricultural Rooms, and thoroughly utilized to confirm printed or manuscript catalogues. Mr. E. J. Ferris, of Madison, Lake county, made a collection of the plants of that region, which he kindly gave for reference and study, and which proved of valuable service in the compilation.

Nothing is known of the "printed" northern Ohio catalogues. Young Newberry (1844) made a manuscript list of the plants of Summit County. The title page of this manuscript, which is now in the library of the New York Botanical Garden, is in Klippart's handwriting. No further information has been learned of Ferris. Richard Lee Howard (1809-1854) came from Massachusetts to Portage County about 1831 and from there to Elyria about 1836. In 1844, he moved to Columbus, where he was associated with the old Starling Medical College and where he edited the *Ohio State Medical Journal* from 1849 to 1853 (Handerson 1912). Klippart and Bolander labored jointly until 1860, when for reasons of failing health, Bolander repaired first to his native Germany and then with success to San Francisco (Jepson 1898). Those herbarium specimens in Klippart's State Agricultural Rooms were destroyed by a fire in 1872 (Klippart 1878).

In the 1850s, young John Strong Newberry (1822-1892), who later distinguished himself as a geologist, paleontologist, and paleobotanist of North America, prepared a list of the plants of the state as part of a

report to the Medical Society of Ohio. The list was eventually published under the title *Catalogue of the Flowering Plants and Ferns of Ohio* (Newberry 1860), as part of Klippart's *Fourteenth Annual Report of the Ohio State Board of Agriculture . . . for the Year 1859* (1860), and is usually considered the first state plant catalogue. The scientific and common names and notations of the general area of the state (e.g., northern, southern, or specific county) in which the species could be located were given for 1,394 taxa. The *Catalogue* was not based entirely on herbarium specimens, but was compiled from previously published local checklists and from the author's own manuscript catalogues of plants for Summit and Cuyahoga counties.

Many years later, Klippart (1878) claimed to have played a crucial role in compiling Newberry's *Catalogue*.

> [Bolander and my] catalogue of the plants of Ohio . . . was the first attempt of which I have any knowledge of making a catalogue embracing the plants of the entire State. . . . After we had completed the catalogue, we employed Miss Mary Short (known as "Cultivator Mary") to make a neat and clean manuscript copy for the printer. When this was completed I showed it to my friend, Prof. John S. Newberry, who had many kind words of commendation to give me for the labor and care bestowed on it, and concluded by saying that he would be glad to take it along home, examine it carefully, as it was the first attempt at a State catalogue, it was too important a work to put to press without rigid examination. I not only gave him "Mary's" copy, but gave him, at the same time, all the printed catalogues I had collected, and asked him to write some appropriate prefatory remarks, to be published with the catalogue in the Agricultural Report for 1859. . . .
>
> He never returned "Mary's" catalogue, but sent me, as he wrote me, the catalogue revised by re-writing the entire catalogue himself, making some changes in specific names, and some other changes so as to comport with the latest knowledge on the subject.
>
> I have deemed this statement necessary in order to vindicate "truth of history." I do not feel that I am entitled to any greater credit for compiling a catalogue of the plants of Ohio from herbariums and printed catalogues than I am for compiling a catalogue or list of drain-tile establishments in the State, together with the number of rods of tile made, etc., etc., from original manuscript circulars; but when the plant catalogue is quoted and *praised*, and I am denied any credit or merit whatever — not by Mr. Newberry; he has, on all occasions since the publication, always accorded to me all the credit that I felt I merited — but by those who know the history of the compilation, I feel that longer silence on my part would result in injustice to myself.

In the fall of 1873, Henry C. Beardslee, Sr. (1807-1884), of Painesville, prepared a second state plant catalogue, for publication in the final report of the Second Geological Survey of Ohio. Because of financial difficulties, the Survey was discontinued that same fall. Beardslee published a condensation of the work, entitled *Catalogue of the Plants of Ohio, including Flowering Plants, Ferns, Mosses and Liverworts* (1874), and four years later, Klippart reprinted it in the . . . *Annual Report of the Ohio State Board of Agriculture . . . for the Year 1877*. This *Catalogue* of 1,988 taxa gave the scientific names of the plants, along with localities generalized after the manner of Newberry's *Catalogue*. Beardslee's work was based on his own herbarium specimens, which eventually were deposited in the herbarium of Oberlin College, and on catalogues listing plants from Ohio. A *Supplement* to Beardslee's *Catalogue* was published by William R. Lazenby and William C. Werner (1890) of the Department of Botany and Horticulture at The Ohio State University. Their list was based on specimens in the herbarium at the University.

During the period from 1850 to 1890 a few other local floras were prepared which were documented by herbarium specimens. Among these were the catalogues prepared by Joseph F. James (1857-1897) for the vicinity of Cincinnati, by Andrew P. Morgan (1836-1907) for the Miami Valley, and by Albert A. Wright (1846-1905) for Lorain County. James' *Catalogue* (1879) was based primarily on his own specimens, which were subsequently purchased by The Ohio State University, whereas Wright's *Catalogue* (1889) was based on specimens deposited by him and others in the Oberlin College Herbarium, where they remain today. Mor-

gan's *Flora* (1878) was compiled from his own field observations, and may not have been documented with herbarium specimens.

Two excellent local floras were prepared in the next decade by Herbert Lyons Jones (1866-1898) for Licking County, and by Edwin Lincoln Moseley (1865-1948) for Erie County, the peninsula of Ottawa County, and the islands in western Lake Erie. Jones' annotated *Catalogue* (1892) is documented with specimens deposited in the herbaria of Denison University and Oberlin College. Moseley's annotated *Catalogue* (1899), one of the finest ever assembled in the state, was thoroughly documented with specimens which he placed in the high school museum that he developed at Sandusky. This museum, considered the finest high school museum in the country, contained over 17,000 specimens representing all phases of natural history. It was transferred to Bowling Green State University in 1936, to become the nucleus of that institution's collections in natural history (Mayfield 1984).

THE STATE HERBARIUM FROM ITS FOUNDING TO THE 1940s

The State Herbarium had its origin with the founding of the Ohio Agricultural and Mechanical College, now The Ohio State University, in 1870 (Meyer 1983, Stuckey 1982). The new school developed from the Morrill Land Grant College Act, signed by President Abraham Lincoln on 2 July 1862. As governor of Ohio, Rutherford B. Hayes (1822-1893) took an active interest in the creation of the institution, as did Joseph Sullivant, who worked diligently to secure Franklin County as the location for the new school. Sullivant, who was secretary of the Board of Trustees for its first 10 years, fought for a broadly-based curriculum, as opposed to one of a strictly agricultural and mechanical orientation, and the ultimate adoption of his ideas determined the future direction of the school (Kinnison 1970).

In 1873, Norton Strange Townshend (1815-1895) was appointed the first Professor of Agriculture, and began to assemble specimens in the biological sciences. As early as 1875 the minutes of the Board of Trustees mentioned the existence of an herbarium associated with the teaching of botany (Meyer 1983). In the Department of Botany and Horticulture, founded in 1881 as part of the School of Agriculture, a small collection of dried plants was developed from contributions by Townshend, Department Chairman William Rane Lazenby (1850-1916), and Lazenby's assistants William C. Werner (1851-1935) and Moses Craig (1864-1913). Reference to this early University Herbarium was made by Augustine D. Selby (1859-1924) and Craig in *A Preliminary List of the Plants of Franklin County* (1890), by Lazenby and Werner in a *Supplementary List to the Plants of Ohio* . . . (1890), and by a former student, E. E. Bogue (1864-1907), in a letter to the editor of *Science* (1891). Bogue noted that:

> In the botanical laboratory is found specimens of plant-life from many parts of the world, and several herbariums both of our flora and many plants from other countries. . . .
>
> Students are encouraged, in the natural sciences especially, to do original and independent investigation; and to facilitate this, excursions are made to places of especial geological, botanical, or entomological interest. . . .
>
> Among the many needs of the institution may be mentioned . . . a fire-proof building in which to place the valuable geological and botanical museums and the library, more class-rooms, and better equipment in all departments.

In the fall of 1891, William Ashbrook Kellerman (1850-1908) arrived as professor and chairman of the newly-created Department of Botany and Forestry, which three years later became the Department of Botany. Forceful direction was now given to the development of an herbarium. Kellerman enlarged the existing collection of plants and in 1893 divided it into two components, designating one a State Herbarium of plants from Ohio and the other a General Herbarium of plants from elsewhere. Since then the State Herbarium has continuously and steadily grown, becoming the focal point and source of documentation for floristic work in Ohio.

The General Herbarium has also grown, but not as consistently and steadily as the State Herbarium. The two components were physically separated until the late 1960s, when, under the curatorship of Ronald L. Stuckey (1938-), all of the specimens in a particular family and genus were brought together in the same case(s). However, each component still retains its identity, as the specimens are filed in color-coded folders representing the different geographical areas of the world (Meyer 1983).

The State Herbarium was organized to show the distribution and morphological variations of all kinds of plants from all parts of the state (Meyer 1983, Stuckey 1982). A beginning effort was made to obtain a specimen of every species from each of the 88 counties. Each species was indexed on a card showing a map of Ohio, and those counties were marked which were represented by specimens. By the fall of 1896, the State Herbarium contained about 6,000 specimens (Anonymous 1896). According to the first published report, the collection contained over 10,000 sheets of vascular plants (Kellerman 1900a). In addition, the herbarium had large numbers of specimens of nonvascular plants, including mosses, fungi, and lichens, but these were not counted and were only partially mounted and arranged. The year-to-year progress of the State Herbarium was described by Kellerman (1900a, 1901a, 1902, 1903) in the *Annual Report{s} of the Ohio State Academy of Science,* and by Kellerman and his assistants in *The Ohio Naturalist* (Kellerman and Jennings 1904, Kellerman, York and Gleason 1906). According to the report for 1906, a total of 21,911 specimens were in the State Herbarium. One of the major sources of specimens was volunteer contributors. Over 115 names of these individuals and the numbers of specimens they had contributed were recorded through 1906. Kellerman's success in obtaining specimens from such a large number of donors must have come in part from his teaching, from his publication of papers which provided directions for the preparation of herbarium specimens (Kellerman 1894, 1896, 1908, without date; Conrad 1912), and perhaps from contacts made during his travels about the state while conducting work for the Farmers' Institutes (Anonymous 1896-1897, 1899).

One of the earliest research activities of the State Herbarium was a catalogue of the plants of the flora. Werner (1893a, b, 1894) prepared some notes on plants new for the state flora, and Kellerman and Werner published a *Catalogue of Ohio Plants* ("1893" [1894]) based on specimens deposited in the State Herbarium, as well as on information taken from previously published state and county catalogues. Three years later, Kellerman issued *The Fourth State Catalogue of Ohio Plants* (1899a), and additions to this list were published intermittently by Kellerman (1899b, 1900b, c, 1901a, b, c), Kellerman and Tyler (1901, 1902a, b), and Kellerman and Jennings (1904), in addition to those lists that appeared in the annual reports. After Kellerman began making botanical expeditions to Guatemala in 1905, no more supplements to the *Fourth Catalogue* were published, but additions to the Ohio flora were made by his assistants, Freda Detmers (1907, 1908) and Otto E. Jennings (1909). Kellerman and his assistant, John Henry Schaffner (1866-1939), who came to the University in 1897, encouraged other studies that involved making use of the information in the State Herbarium. They and their students during this formative period published, primarily in *The Ohio Naturalist* and *The Ohio Journal of Science,* over 80 papers on the composition, taxonomy, distribution, and ecology of the Ohio flora. Unfortunately, this activity was jolted by Kellerman's sudden death in March 1908, while on his 4th expedition to Guatemala. Schaffner became chairman of the Department and directed the work in the herbarium from that time.

Under the leadership of Professor Schaffner, the herbarium continued to enlarge. By 1935, over 40,000 sheets of vascular plants had been accessioned for the State

Herbarium, and by the time of Schaffner's death in 1939, some 55,000 specimens were housed there. Schaffner (1934) stated that the herbarium was "greatly hampered by a lack of suitable cases to hold this valuable collection properly. . . ," but reported later (1937) that steel cases had been obtained for the specimens. Furthermore, the General Herbarium, having been "packed away in boxes in the autumn of 1914, was now arranged in cases again." Additions were made to the General Herbarium in the following years.

Schaffner took an active interest in the Ohio flora and published additions to the state lists (Schaffner 1909, 1910, 1912a, b), a *Catalog of Ohio Vascular Plants* (1914), and a *Revised Catalog . . .* (1932). Until his death in 1939, he issued annual additions to these catalogues in *The Ohio Naturalist* and its successor, *The Ohio Journal of Science* (Schaffner 1915, 1916-1932, 1933-1938, Schaffner and Jones 1939). Schaffner and his students emphasized the preparation of taxonomic treatments of certain vascular plant families in Ohio. Over 30 papers of this type were published, mostly in *The Ohio Naturalist* and *The Ohio Journal of Science.* Schaffner himself published taxonomic papers in these and other journals from 1905 to 1939 (Waller 1941). Following Schaffner's death, Clyde Harold Jones (1902-1974) was appointed curator. Jones continued the work of Schaffner by adding specimens to both the State and General Herbaria, and by his additions to Schaffner's revised catalogues (Jones 1940-1943).

Unfortunately, little activity took place in the herbarium in the mid-1940s, largely due to the effects of World War II. Thus, after an existence of over 50 years, the State Herbarium nearly ceased to function. But with the appointment in 1949 of Clara Gertrude Weishaupt (1898-) as curator, the herbarium began a rejuvenation that has made it a viable teaching, research, and public service facility of the University today.

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